



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/667,798	09/19/2003	Glenn Ratificar	P16916	9572
28062	7590	04/20/2006	EXAMINER	
BUCKLEY, MASCHOFF, TALWALKAR LLC 5 ELM STREET NEW CANAAN, CT 06840				ZARNEKE, DAVID A
ART UNIT		PAPER NUMBER		
				2891

DATE MAILED: 04/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/667,798	RATIFICAR ET AL. <i>(AM)</i>	
	Examiner David A. Zarneke	Art Unit 2891	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 16 February 2006.
- 2a) This action is FINAL.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) 1-12, 16, 21 and 24-29 is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 13-15, 17-20, 22 and 23 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 19 September 2003 is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
    - a) All    b) Some \* c) None of:
      1. Certified copies of the priority documents have been received.
      2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
      3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
 Paper No(s)/Mail Date 9/19/03.
- 4) Interview Summary (PTO-413)  
 Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) Notice of Informal Patent Application (PTO-152)
- 6) Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Election/Restrictions***

Applicant's election with traverse of claims 13-15, 17-20, 22 and 23 in the replies filed on 1/13/06 and 2/16/06 is acknowledged. The traversal is on the ground(s) that:

- 1) the reason for restricting groups I & II and I & III does not distinguish a materially different process; and
- 2) the reason for restricting groups II & III has no bearing on whether the combination requires the particulars of the subcombination.

These arguments are not found persuasive because:

- 1) the two processes would be patentably distinct, therefore they would inherently be materially different; and
- 2) yes it would have bearing on whether the combination requires the particulars of the subcombination. The subcombination requires the second underfill to be either a no flow or a capillary flow underfill. Neither of these limitations are found in the combination.

Therefore, the requirement is still deemed proper and is therefore made FINAL.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

- (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 13-15, 17-20, 22, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Roldan et al., US Patent 6,005,292, in view of Wang et al., US Patent 6,258,626, Derderian, US Patent 6,569,709, Capote et al., US Patent 6,297,560, Ito et al., US Patent 6,333,206.

Roldan teaches a device comprising:

a first integrated circuit die [36], a first side of the first integrated circuit die comprising a first plurality of electrical contacts [38]; and

a second integrated circuit die [30], a first side of the second integrated circuit die comprising a second plurality of electrical contacts [46].

Roldan fails to teach no-flow underfill material in contact with the first side of the first integrated circuit die.

Wang (3, 63+) and Derderian (8, 29+) teach using a no flow adhesive between a first and second die, wherein the electrical contacts are not facing each other.

Capote and Ito teach the use of a no flow underfill between a board and a chip, wherein the electrical contacts are facing each other.

The combination of these references show that it would have been obvious to one of ordinary skill in the art at the time of the invention to use no flow underfills between two chips having their electrical contacts facing each other because Ito (1, 45+) and Capote (2, 25+) teach the use of a no flow underfill is quicker and easier than gap fill underfills.

Regarding claim 14, Wang teaches the first integrated circuit die comprising a second side, the device further comprising: second underfill material [114] in contact with the second side of the first integrated circuit die; and a substrate [120] in contact with the second underfill material (figure 7). While Roldan fails to teach attaching the die stack to a substrate, it would have been obvious to one of ordinary skill in the art at the time of the invention to do so because that is the conventional next step. The dies stack obviously has to be attached to something to make it useful.

With respect to claim 15, Wang teaches the second side of the first integrated circuit die comprises a third plurality of electrical contacts, wherein the substrate

comprises a fourth plurality of electrical contacts, and wherein ones of the fourth plurality of electrical contacts are electrically coupled to respective ones of the third plurality of electrical contacts (figure 7).

As to claim 17, Wang teaches the second underfill material comprises capillary flow underfill material (4, 4+).

In re claim 18, Capote teaches the no-flow underfill material comprises fluxing functional groups (9, 23+).

Regarding claims 19 and 20, though none of the references specifically teach the first side of the second integrated circuit die comprises first integrated devices and a second side of the first integrated circuit die comprises second integrated devices, it would have been obvious to one of ordinary skill in the art at the time of the invention to arrange the integrated devices as such because, barring a showing of unexpected results, this is a conventionally known in the art design choice. The placement of the integrated devices on the dice are known to skilled artisans to be placed on either side of the dice in any combination. Design choices and changes of size are generally recognized as being within the level of ordinary skill in the art (MPEP 2144.04(I), (IVA) & (IVB)).

With respect to claim 22, barring a showing of unexpected results, changes in relative size and proportion were held to be obvious matter of design choice. Design choices and changes of size are generally recognized as being within the level of ordinary skill in the art (MPEP 2144.04(I), (IVA) & (IVB)).

As to claim 23, Derderian teaches the second integrated circuit die comprises a memory cache (1, 39+).

**Conclusion**

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The prior art cited but not relied upon teach the state of the art.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David A. Zarneke whose telephone number is (571)-272-1937. The examiner can normally be reached on M-Th 7:30 AM-6 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William Baumeister can be reached on (571)-272-1722. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



David A. Zarneke  
Primary Examiner  
April 15, 2006